T E C H N I C A L M E M O R A N D U M

Utah Coal Regulatory Program

April 9, 2004

TO: Internal File

THRU: Dana Dean, Environmental Scientist III/Team Lead.

FROM: Priscilla Burton, Environmental Scientist III/Soils.

RE: Refuse Pile Redesign and Post Mining Land Use Change, Plateau Mining Corporation, Willow Creek Mine, C/007/0038, Task #1875

SUMMARY:

The Division received an application from Plateau Mining Corporation on December 18, 2003 revising the design for the Schoolhouse Canyon refuse pile to create a more natural looking channel and side slopes in the canyon, as illustrated on the revised Plates 3.4-9 through 3.4-12. The initial information was reviewed under Task 1788. Additional information was received on March 22, 2004 and is the subject of this review.

Included in the revisions to v. 10, Ex 19 sections 3.4-6, 3.4-7 and 3.4-8 is a change in post mining land use (from wildlife habitat and grazing to industrial use) for 46.2 acres of the Willow Creek preparation plant (Appendix 3.4L). Exhibit 3.4-12 outlines the location of the post mining land use change. All the disturbed area north of Schoolhouse Canyon and the access road from the south will have an industrial post mining land use. The structures to remain after reclamation to support the industrial post mining land use are labeled on Exhibit 3.4-12. They are the substation, warehouse/bathhouse/shop, pumphouse, and water treatment plant at the mouth of Barn Canyon.

Reclamation plans for the 46.2 industrial site entails grading 29,920 CY mostly in the vicinity of the mine water treatment pond and School house canyon access road (Table 3.4-5 and sec 3.4-6(2)).

Plans for the clean coal stockpile are to use 10,639 CY of previously salvaged topsoil (stored in the Willow Creek stockpile) to reclaim the cut slope. Thus the clean coal stockpile cut slope (3.91 acres at 2.5h:1v slope) will receive twenty inches of replacement topsoil.

The new reclamation design for School House Canyon (sec 3.4-6(2)) requires moving 172,318 CY of refuse and 20,508 CY of Pond 013 fill material to create a drainage channel down the center of the canyon to the culvert leading to the Price River (Table 3.4-5). Cuts will be from 20 to 40 feet deep in the existing surface of the refuse, exposing buried coal mine waste (Ex. 3.4-10). The Permittee in communication with the Division (teleconference on February 6, 2004 and on site meeting February 10, 2004) developed a means of monitoring the characteristics of the regraded refuse prior to placement of the cover soil through sampling and analysis.

Cover over the refuse in Schoolhouse Canyon will increase from the currently approved plan of twenty seven inches to thirty six inches. Cover will come from the Gravel Canyon storage area, the Willow Creek stockpile and from the Pond 013 embankment.

Using load counts, the Permittee estimates that 36,984 CY of topsoil has been transported to Schoolhouse Canyon to date (Email communication from J. Pappas, April 12, 2004). The Permittee is keeping load counts of the material moved from the Willow Creek stockpile. After reclamation is complete, Table 3.4-5 will be revised to indicate the amount of topsoil transported from Gravel Canyon and Willow Creek Canyon to the Schoolhouse Canyon refuse site (J. Pappas personal communication, April 12, 2004).

TECHNICAL ANALYSIS:

GENERAL CONTENTS

PERMIT APPLICATION FORMAT AND CONTENTS

Regulatory Reference: 30 CFR 777.11; R645-301-120.

Analysis:

The MRP indicates that Mollisol's from Barn Canyon currently stored at the Willow Creek topsoil storage site (Map 18B) will be returned to Barn Canyon as a final top dressing (v.1, sec 4.2, p. 4.2-10). However, page 4.2-10 indicates that the Barn Canyon shaft site was never developed.

Findings:

The information provided meets the requirements of the Regulations for Permit Application Format and Contents.

PERMIT AREA

Regulatory Requirements: 30 CFR 783.12; R645-301-521.

Analysis:

Table 4.5-1 provides a summary of the mining related disturbance by location. The total bonded area is 176.35 acres. The total area to have an industrial post mining land use is 82.5 acres. Table 4.5-1 lists 92.96 acres within the disturbed area boundary at the Preparation Plant and Loadout area, however only 77.9 acres were actually disturbed (sec 3.4-6(2)). Section 3.4-6(1) indicates that 46.2 acres will have the post mining land use changed, (see also Table 4.5-1, Map 3.4-12, and Appendix 3.4L). Table 4.5-1 reports that within the preparation plant area, 46.76 acres will be **reclaimed** to support the wildlife post mining land use. However, the plan indicates there will be 49.1 acres **remaining** to support the wildlife post mining land use (p3.4-18). The difference between the two figures is accounted for by Barn Canyon which was never disturbed and is currently wildlife habitat (e-mail communication from J. Pappas April 12, 2004).

Findings:

The information provided meets the requirements of the Regulations.

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

The soils of the Willow Creek Preparation Plant are discussed in Volume 1, Section 3.1 and Volume 13, Chapter 8.

Soils and refuse analytical information for the Willow Creek preparation plant is found in the MRP volumes 4 and 5, Exhibit 5 – Soils Information; and Volume 13, Appendix 8-2; and Volume 6, Exhibit 9. Soil sampling locations are found on Map 4 Willow Creek Mine Facilities Area Soils Map (found in v. 2) and on the Castle Gate Area Preparation Plant Facilities Soil Survey Map, Exhibit 8-4 (found in v. 13).

The disturbed soils of the preparation plant were sampled in 1979 by Horrocks & Carroll for Price River Coal Company (five backhoe pits) and again in 1990 (six samples). The 1990 samples were composited over a depth of 0 – 4 feet and analyzed by Intermountain Laboratories (Farmington) (found in v4, Ex 5, Soil Sample Analyses Data. These 1990 analytical results indicate that the waste in the vicinity of the mine water treatment pond are high in boron (4 ppm reported for the sample combined from two locations (sites 3 & 4) and composited over the 0 - 4' depth. In addition, the Sodium Adsorption Ratio is between 4 and 6 mmhos/cm for the composited samples taken at locations 5 and 6. The MRP indicates that the soils of the preparation plant will be resampled at 500 ft intervals before final grading to assure suitability as defined by the 1988 UDOGM Topsoil/Overburden Guidelines (v. 1 sec. 4.2.2.2). This commitment was not repeated in the current proposal. (See deficiency written under R645-301-731).

Ten undisturbed soil locations were sampled on the slopes of the Schoolhouse Canyon refuse site in 1996. Analytical results from this sampling are summarized in Table 3.1-1A of volume 1. The ACZ laboratory analytical reports are found in v. 5, under Schoolhouse Canyon Refuse Pile and Castle Gate Conveyor 1996 Soils Analyses. Three facts stand out from reviewing these analyses:

1. At location SHRP –9, the undisturbed soil was acid forming in the C2 horizon (7 – 17 inches).
2. All the undisturbed soils had very high saturation percentages, which was at odds with the texture determined by the hydrometer method in half of the reports.
3. The background level of boron in the undisturbed subsoil (all C horizons) averages 1.2 ppm.

Three undisturbed soil samples were taken from the slopes of the clean storage coal stockpile (v.13, Chap 8., Appendix 8-3). These samples labeled CPTP-1 through 3 indicate that the native soils have an SAR of approximately 0.83 units and a pH of 7.7, on the average. The soils collected from these slopes have a neutralization potential of about 100 tons/KT of soil and an innate boron content averaging 1.27 ppm.

The undisturbed soils of the Willow Creek Office/Bathhouse site are represented by samples taken in 1995 (designated 95WCTO 11, 12, 13) and samples taken in 1996 designated U WC96 1, 3, 6, 11, 12. Disturbed soils removed during project development are respresented by samples taken in 1988 and 1989 and by all the remaining samples designated WC 96 and WC 95

taken in 1995 and 1996. All samples of the Willow Creek Office/Bathhouse site were analyzed by ACZ Laboratories (Steamboat Springs, CO). These samples indicate that the soil is near neutral in pH with low SAR values. The samples all have between 10 – 16% clay. To the extent that these samples represent the content of the Willow Creek substitute topsoil pile, the material is suitable for use as substitute topsoil over the Schoolhouse Refuse site and /or the Castle Gate Preparation Plant site as well as the intended use of reclamation of the Office/Bathhouse site.

The Soils of Barn Canyon were surveyed and sampled in 1998 by Jim Nyenhuis (four backhoe pits). The Barn Canyon survey and sampling locations are provided in v. 5, Exhibit 5, Figure 3.1-1. As indicated on page 4.2-10 and Table 4.2-1, the Barn Canyon shaft was never developed and soils were not disturbed.

Soils information for the Gravel Canyon storage area is described in MRP v.13, sec 8.4-2(4) and v. 11, sec 3.6. Exhibit 3.6-2 and 3.6-3 (v. 11) illustrate the operations and reclamation contours for the site. The five acre Gravel Canyon site was previously disturbed for road construction materials. Native soils were lost. Its use as a topsoil storage area began in 1983. The reclamation plan described in the MRP for the Gravel Canyon Mine site entails removing 97,000 cu yds of stored topsoil from Gravel Canyon (v. 11, sec 3.6, Table 3.6-6 and Figure 3.6-5). However, current plans are to leave material stored in Gravel Canyon for reclamation of the canyon (Sec 3.4-6(2) p 3.4-23). To date 36,9984 CY of topsoil have been removed from Gravel Canyon and placed in Schoolhouse Canyon (Email communication from J. Pappas, April 12, 2004). The Permittee will be updating the Gravel Canyon reclamation plan (Section 3.6) in the near future (personal communication with J. Pappas, April 12, 2004).

Findings:

The information provided meets the requirements of the Regulations.

RECLAMATION PLAN

POSTMINING LAND USES

Regulatory Reference: 30 CFR Sec. 784.15, 784.200, 785.16, 817.133; R645-301-412, -301-413, -301-414, -302-270, -302-271, -302-272, -302-273, -302-274, -302-275.

Analysis:

The structures to remain after reclamation to support the industrial post mining land use are labeled on Exhibit 3.4-12 and includethe substation, warehouse/bathhouse/shop, pumphouse, and water treatment plant at the mouth of Barn Canyon.

Findings:

The information provided meets the requirements of the Regulations.

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

Redistribution

The Willow Creek topsoil stockpile is described in Section 4.2 of Volume 1. The stockpile holds 120,470 CY (Table 4.2-1) of which 43,536 CY (Table 5.4-2) are required for the industrial post-mining alternative reclamation plan (approved and incorporated in January 2004). This leaves a possibility for use of 76,934 CY to cover the School House Canyon refuse site. The characteristics of the materials in the Willow Creek stockpile are described in Section 3.1.2.4.

The Gravel Canyon storage site holds 107,639 CY (Table 4.2-1). Using load counts, the Permittee estimates that 36,984 CY of topsoil has been transported to Schoolhouse Canyon to date (Email communication from J. Pappas, April 12, 2004). By difference, 70,655 CY of topsoil remains in Gravel Canyon for reclamation of that site.

The Permittee is keeping load counts of the material moved from the Willow Creek stockpile. After reclamation is complete, Table 3.4-5 will be revised to indicate the amount of topsoil transported from Gravel Canyon and Willow Creek Canyon to the Schoolhouse Canyon refuse site (J. Pappas personal communication, April 12, 2004).

The reclamation plan for the preparation plant site entails removing 80,654 CY of stockpiled topsoil from Gravel Canyon and Willow Creek stockpiles and 16,146 CY of excess cut from Pond 013 embankment to cover the refuse with three feet. Using soil from the Willow Creek stockpile allows for some topsoil to be left in Gravel Canyon to contribute towards reclamation of that site (Table 3.4-5 and Sec 3.4-6(2) p 3.4-23.

The MRP describes twenty inches of cover over the clean coal storage area and Pond 011 Expansion area (v. 1, sec 5.2, p 5.2-2). Further information on reclamation of the preparation plant, loadout, clean coal storage area and schoolhouse Cyn refuse pile is found in v. 10, Ex 19, sec 3.4-6.

Currently the MRP describes the use of the graded surface within the preparation plant area as substitute topsoil (v1, sec 5.2, p5.2-2). This plan remains unchanged with this submittal, except for the clean coal storage area and Pond 011 expansion area discussed above. Reclamation plans for the 46.2 acre industrial site entails grading 29,920 CY mostly in the vicinity of the mine water treatment pond and School house canyon access road (Table 3.4-5 and sec 3.4-6(2)). Pits were dug during February 2004 at several locations in the preparation plant and samples were taken to ascertain the characteristics of the existing soils (Appendix 3.4M has the sample locations and results).

Plans for the clean coal stockpile are to use 10,639 CY of topsoil (stored in the Willow Creek stockpile) to reclaim the cut slope. Thus the clean coal stockpile cut slope (2.5h:1v and 3.91 acres) will receive twenty inches of replacement topsoil.

The MRP currently describes twenty seven inches of cover over the refuse in Schoolhouse Canyon (V. 13, Chap 8, p8-17 and v. 1, sec 5.2, p 5.2-2 and v. 1, sec 4.2, page 4.2-4). This depth will increase to a minimum of thirty six inches under the proposed plan (section 3.4-6(2), using 96,800 cu yds from two sources: 80,654 cu yds from either the gravel canyon or willow creek stockpiles and 16,146 cu yds from the Pond 13 embankment. In actuality, there are deep pockets of topsoil along the main drainage channel and against the north facing slope.

During a field visit on January 29, 2003, the pond 013 embankment was observed to be vegetated with fragments of red rock scattered on the surface. The embankment was assumed to have come directly from the location of the pond excavation.

No fertilizer will be applied.

The MRP indicates that the graded surface will be deep ripped prior to topsoil coverage (v. 1, sec 5.2, p 5.2-2). However, the proposal has removed this commitment from Section 3.4-6 in Exhibit 19, in favor of gouging (sec 3.4-6(1)). The MRP currently states that the slopes less than 20% slopes will be deep ripped to a depth of 18- 24 inches prior to topsoil application (v 10, sec 3.4, p 3.4-23.) This commitment has been replaced with the commitment to mechanically gouge the refuse pile slopes to a depth of 18-24 inches (sec. 3.4-6(1)). The extent of the gouging is shown on Ex 3.4-12. The gouging process will extend into the area of industrial post mining land use

Findings:

The information provided meets the requirements of the Regulations.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 784.14, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-301-512, -301-513, -301-514, -301-515, -301-532, -301-533, -301-542, -301-723, -301-724, -301-725, -301-726, -301-728, -301-729, -301-731, -301-733, -301-742, -301-743, -301-750, -301-751, -301-760, -301-761.

Analysis:

Hydrologic Reclamation Plan

The new reclamation design for School House Canyon (sec 3.4-6(2)) requires moving 172,318 tons of refuse and 20,508 tons of Pond 013 fill material to create a drainage channel down the center of the canyon to the culvert leading to the Price River (Table 3.4-5). Cuts will be from 20 to 40 feet deep in the existing surface of the refuse, exposing buried coal mine waste (Ex. 3.4-10 and 3.4-10a).

A report of sampling of the refuse in 1982 by Native Plants Inc (v. 4, Ex 5, Soil Sample Analysis Data) indicates boron levels were at 58 ppm in the "new" Schoolhouse refuse. (This same report indicates that "Gob" sampled at Castlegate had an SAR of 13.4.)

The refuse was sampled at seven locations in 1990. Soil sampling locations are found on Map 4 Willow Creek Mine Facilities Area Soils Map (found in v. 2) and on the Castle Gate Area Preparation Plant Facilities Soil Survey Map, Exhibit 8-4 (found in v. 13). These samples were analyzed in 1990 by Intermountain Laboratories in Farmington, New Mexico (v.4, Ex 5, Soil Sample Analysis Data). The notable characteristic of the waste is elevated SAR values below the two feet of soil cover (6.5 – 10 units) and correspondingly high exchangeable sodium percentages (39 - 65%) at four out of seven sampling locations (sample locations 2, 4, 5, & 6).

Other analyses that may be pertinent to the quality of the refuse are those found in v. 4 and v. 5, Exhibit 5:

- 1994 Soil Sample Site (v. 4 sample ID 94-12-1R and 2R);
- Willow Creek Mine 1995 Soils Analyses (v. 5 sample ID 95WCWT01 and 02);
- Willow Creek Mine 1996 Soils Analyses (v. 5 sample ID sites WC96-1, WC96-2, WC96-4, WC96-5, WC96-7 & WC96-10 were in coal mine waste);
- Willow Creek Mine 1994 "D" seam Roof and Floor Samples (v.4);
- and miscellaneous samples of refuse (v. 4).

In particular samples 94-12-1R and 9412-2R taken in 1994; and 95WCWT01 and 95WCWT02 taken in 1995 in the same location provide information on coal waste removed from the Willow Creek facilities pad and placed in Schoolhouse Canyon. These samples are located on Map 4. No depth interval was reported with these samples and the Division assumes

that they were a composite taken from the top few feet. Samples taken in 1994 revealed elevated levels of boron (4.5 and 7.2 ppm) and prompted the 1995 sampling. The 1995 samples do not indicate high boron, however no depth interval was reported with these samples and they may also represent mostly the surface (cover) soil material placed over the waste. A minimum depth of eighteen inches of cover was specified by the Abandoned Mine Lands (AML) Price River Coal Pile contract (AML/007/907 Phase III, p101).

Samples taken in 1996 of the buried waste were composited by depth interval (the WC96 series). As discussed above, the intervals from 0 – 48 inches would have included the soil cover over the waste that was specified by the AML contracts. The sampling showed boron concentrations of the waste at toxic levels for plant growth (10 – 95 ppm boron below 50 inches) at the four waste sampling locations (sites WC96-2, WC96-4, WC96-5, & WC96-10). These samples represent approximately 460,000 cu yds of waste buried in the Willow Creek Disposal Site (AML/007/907 Phase III, pp 93,98,104). The 1996 Annual Reports provided cross-sections that shows the elevation of this AML waste within the Schoolhouse Canyon refuse pile (personal communication with Mr. Pappas on February 10, 2004). The cross-sections show the elevation of the AML waste is between 6390 and 6448 ft across the width and length of the refuse pile. Accordingly, samples of the waste encountered at Stations 14+00 (sampling elevation 6381 ft) and 15+00 (sampling elevation 6402 ft) were taken on February 10, 2004 for analysis of pH, EC, SAR, hot water soluble boron, and texture. Sampling locations and sample analysis results should be included in the application.

The quality of the waste brought to the Schoolhouse Canyon during the operation of the Willow Creek Mine is represented by the Willow Creek Mine 1994 "D" seam Roof and Floor Samples (personal communication with Johnny Pappas, January 29, 2003). The information found in v. 4, Ex 5 is as follows:

- Roof and floor samples with the identification 94-33-1D, (two samples each of roof and of floor) were within the limits of suitability for boron, SAR, and Acid Base Potential.
- Roof and floor of location 94-12-1D was also sampled twice. Although SAR was elevated (10.3 – 14.5 units), samples were otherwise within the limits of suitability for boron, SAR, and Acid Base Potential.

Thus, information in the MRP concerning Schoolhouse Canyon indicated that it may contain high levels of boron and may be saline-sodic. Boron is an essential micronutrient for plant growth, but is required in small concentrations. Boron toxicity to agricultural plants occurs when soils contain more than 5 ppm of hot-water-soluble boron. In boron rich areas, many native plant varieties are adapted to boron levels in excess of 5 ppm. Generally boron tolerance follows sodium tolerance. As noted in the discussion above, the sampling of the AML waste showed boron concentrations at levels between 10 and 95 ppm boron. These levels of boron are likely toxic even to the native plants.

The Schoolhouse refuse contains high levels of exchangeable sodium that will form ionic bonds with the boron to create soluble sodium-borate salts. These boron salts are quite mobile in soils. Low rainfall allows soluble borate salts to accumulate in the surface layer. Boron uptake by plants depends upon the activity of the B in soil solution. The Schoolhouse refuse has little organic matter, clay polymers or carbonates to adsorb the boron and keep it from being plant available.

Although boron can be leached from the soil with water, this process would take about three times as much water as to leach sodium from the soil and would contribute to degradation of the receiving waters. Therefore, the best approach to dealing with elevated boron concentrations is either avoidance of the material or where necessary, selective burial of high boron waste.

Mr. Pappas has indicated that the regraded waste pile will intercept the storage location of the potentially high boron waste along the length of the regraded drainage from Station 22+00 down through Station 14+00. Below Station 14+00. Cross sections for station locations 26+00 through 14+00 showing the final elevation of the graded site have been provided in conjunction with the 1996 cross-sections from the Annual Report, to establish the location of the waste within the pile (see Schoolhouse Canyon Refuse Pile Upper Terrace Topography and Sections Plate 1 dated December 2000 and March 1, 1996.

The Permittee in communication with the Division (teleconference on February 6, 2004 and on site meeting February 10, 2004) developed a means of monitoring the characteristics of the regraded refuse prior to placement of the cover soil. As noted above, on February 10, 2004 samples were drawn from Station 14+00 below the established location of the high boron waste and from Station 15+00 within the established location of the high boron waste. This preliminary information indicated hot water soluble boron levels between 6 and 10 ppm.

This preliminary information was followed by composite sampling of the final graded surface of the refuse pile on February 24, 2004, for the parameters of concern: pH, EC, SAR, boron and texture at station locations 21+00, 19+00, 17+00, 15+00, and 13+00 prior to placement of channel bedding, rip rap and cover soil. Information collected from this sampling is in Appendix 3M. Sodium Adsorption Ratios (SAR) values fell between 1.3 and 23.0 units with the highest values found at Station 13+00 and Station 21+00. Hot water soluble boron levels were between0.8 and 18.4 ppm, with the highest value at Sta 19+00. [A comparison between the hot water soluble boron levels and the saturated paste levels were attempted. However, this information needs to be repeated since the saturated paste is reported on a liquid basis (ug/ml of extract) and the hot water soluble is reported in ug/g of soil (personal communication with Bruce Webb, BYU Soil and Plant Laboratory, March 24, 2004)].

These extremes of salinity and boron concentrations at Sta 21+00 , Sta 19+00, and Sta 13+ 00 should be alleviated by the minimum three feet of cover over all slopes and by the

additional one foot of bedding, two foot of riprap and one foot of soil cover over the channel itself. In addition, the channel sides are being steepened to 2:1 slopes using topsoil. So that at the side of the channel there are deep pockets of topsoil (see Technical Report #228 dated March 25, 2004).

In addition, the preparation plant soils in the vicinity of the mine water treatment pond, and the pad area just north of Schoolhouse Canyon were excavated by trenching for evaluation and sampling prior to grading (Pits 1, 2, 3, and 6). These soils were analyzed for parameters of concern: pH, EC, SAR, boron and texture, so that suspect areas of high boron waste or elevated salts could be specially handled during grading (Appendix 3M). There appears to be no toxic material at any pit location with pH values falling between 7 and 8 units; Electrical conductivity values between 1.5 and 2.4 dS/m; and SAR values between 1.0 and 5.2 units.

The proposal indicates in section 3.4-6 (2) that acid toxic material will be placed under at least four feet of non-acid/toxic forming material. Mr. Pappas indicated that approximately 6,000 cu yds of storage is available within pond 013 for burial of high boron waste (personal communication on February 10, 2004).

Findings:

The information provided meets the requirements of the Regulations.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Two tons/acre of certified noxious-weed-free-hay will be gouged into the soil surface. Following seeding an additional 1 to 1.5 tons/acre of certified noxious-weed-free-straw will be applied to the surface and sprayed with a tackifier and mulch mixture at a rate of 0.25 tons/acre (v.1, sec 5.2, p.5.2-3). These commitments are restated in section 3.2-6(2) of the application.

Gullies greater than nine inches in depth will be filled as necessary to establish vegetation (v.10, sec 3.4-6(4).

Appendix 3.4K presents the RUSLE calculations for sediment yield. Appendix 3.4K indicates that pre-mining conditions would yield 20.78 tons/acre/yr and after vegetation establishment that yield is reduced to 18.82 tons/acre/yr.

Findings:

The information provided meets the requirements of the Regulations.

MAPS, PLANS, AND CROSS SECTIONS OF RECLAMATION OPERATIONS

Regulatory Reference: 30 CFR Sec. 784.23; R645-301-323, -301-512, -301-521, -301-542, -301-632, -301-731.

Analysis:

Reclamation Backfilling And Grading Maps

Exhibits 3.4-10 and 3.4-10a provide cross sections and Exhibit 3.4-12 provides station locations for the profile of the Schoolhouse Canyon drainage .

The Permittee has indicated in a letter dated March 19, 2004 to Daron Haddock that an as-built topography map will be created from aerial photography of Crandall Canyon, Preparation Plant and Refuse Pile, Gravel Canyon, Adit #1, and the Willow Creek Mine site.

Reclamation Monitoring And Sampling Location Maps

Soil sampling locations and elevations have been indicated on Exhibit 3.4-12 to document the sampling effort.

Findings:

The information provided meets the requirements of the Regulations.

RECOMMENDATIONS:

The application should be approved at this time.